DECLARATION

I, Hyung Nam KIM, Patent Attorney, hereby declare the following:

I am knowledgeable in Korean and English. I have reviewed Korean Patent Application Nos. 10-2002-0043049 and KR10-2003-0006938 and believe the attached document to be an accurate translation thereof.

All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true. Further, these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

January 8, 2009 김형남

Date & Signature: Hyung Nam KIM

[ABSTRACT]

[SUMMARY]

The present invention relates to a method of repeatedly reproducing the whole discs in a multi-disc changer. The method according to the present invention may omit the still mode operation of displaying the DVD title menu picture in the case where the type of the optical disc to be currently reproduced is a DVD-series disc when the all disc repeat play is performed with respect to the plural optical discs seated in the multi-disc changer, and select and reproduce any one of A/V data of the main title recorded in the DVD, or select and successively reproduce A/V data of the titles corresponding to a movie or music, thus making it possible to effectively prevent the stoppage of the all disc repeat play operation requested by the user owing to the navigation information of the DVD.

[REPRESENTATIVE DRAWING]

Fig. 3

[REPRESENTATIVE WORDS]

multi-disc changer, DVD, all disc repeat play, still mode, slot

[SPECIFICATION]

[TITLE OF INVENTION]

METHOD OF REPEATEDLY REPRODUCING ALL DISCS IN MULTI-DISC CHANGER

[BRIEF DESCRIPTION OF DRAWINGS]

Fig. 1 is a block diagram schematically showing the construction of a general multi-disc changer;

Fig. 2 is a view showing an example of a DVD title menu picture outputted and displayed in a still mode in the general multi-disc changer;

Fig. 3 is a flow chart illustrating a method of repeatedly reproducing the whole discs in a multi-disc changer according to the present invention; and

Fig. 4 is a view showing an example of a main title of a DVD selected and reproduced by method of repeatedly reproducing the whole discs in a multi-disc changer according to the present invention.

<DESCRIPTIONS OF KEY ELEMENTS IN DRAWINGS>

10: multi-tray

20: servo system

30: optical pickup

40: VDP system

101, 102, 103, and 104: slots

[DETAILED DESCRIPTION OF INVENTION]

[OBJECT OF INVENTION]

[TECHNICAL FIELD AND BACKGROUND OF INVENTION]

The present invention relates to a method for repeatedly reproducing all discs in a multi-disc changer, which successively or repeatedly plays all optical discs seated respectively in slots of the multi-disc changer capable of loading a plurality of optical discs therein at the same time.

Fig. 1 is a block diagram schematically showing the construction of a general multi-disc changer.

As shown in Fig. 1, the general multi-disc changer comprises a multi-tray 10 including a plurality of slots 101, 102, 103 and 104 for seating a plurality of optical discs therein at the same time, respectively, and a servo system 20 for rotating the multi-tray 10 and the optical discs seated respectively in the slots 101, 102, 103 and 104 thereof.

The multi-disc changer further comprises an optical pickup 30 for reading signals recorded on the optical discs seated respectively in the slots 101, 102, 103 and 104, and a video disc player (VDP) system 40 for processing the signals read by the optical pickup 30.

The VDP system 40 is adapted to, if a user selects a desired one of the optical discs in the slots 101 ~ 104 of

the multi-tray 10 and requests playback of the selected disc, identify a number of the slot corresponding to the selected optical disc and then controls the servo system 20 to rotate the selected optical disc to a position readable by the optical pickup 30.

The VDP system 40 then processes a radio frequency (RF) signal read by the optical pickup 30 and outputs the resulting signal to an external device connected thereto, such as a television set or audio set. As a result, the user can select and play a desired one of the plurality of optical discs loaded in the multi-disc changer.

The VDP system 40 is also adapted to, if the user requests an 'all disc repeat play operation', controls the servo system 20 to sequentially reproduce the optical discs in the slots while sequentially rotating the slots.

As a result, the user can sequentially and repeatedly play all the optical discs loaded in the multi-disc changer in a simple and convenient manner.

However, a compact disc (CD)-series disc has a characteristic of being reproducible just after its recognition, but a DVD-series optical disc has a characteristic of being reproducible only after a DVD title menu picture as shown in Fig. 2 is outputted and displayed in a still mode with reference to initially read navigation information and a user selects and requests playback of a

desired title displayed in the DVD title menu picture. For this reason, the general multi-disc changer has a disadvantage in that the all disc repeat play operation requested by the user cannot be successively performed in the case where a DVD-series optical disc is seated in any one slot of the multi-disc changer.

[TECHNICAL PROBLEMS TO BE SOLVED BY INVENTION]

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a method for repeatedly reproducing the whole discs in a multi-changer, which is capable of, when an all-disc repeat play operation is performed with respect to a plurality of optical discs loaded in the multi-disc changer, omitting a still mode operation of outputting and displaying a DVD title menu picture in a case where the type of the optical discs currently reproduced corresponds to DVD series, and selecting and reproducing any one of the A/V data of the main titles recorded in the DVD or selecting and successively reproducing any one of the A/V data of the title corresponding to a movie or music.

[CONSTRUCTION OF THE INVENTION]

To achieve the above object, a method of repeatedly

reproducing all discs in a multi-disc changer according to the present invention, includes a first step of repeatedly performing an all disc repeat play operation with plural optical discs seated in the multi-disc changer; a second step of identifying the type of an optical disc to be currently reproduced while the all disc repeat play operation is performed; a third step of omitting a still operation based on navigation information of the DVD in a case where the type of the identified optical disc is a DVD disc; and a fourth step of reproducing A/V data corresponding to at least one or more titles recorded in the DVD after omitting the still operation.

Hereinafter, preferred embodiments of a method of repeatedly reproducing the whole discs in a multi-disc changer according to the present invention will be described in detail according to the present invention.

Fig. 3 is a flow chart illustrating a method of repeatedly reproducing the whole discs in a multi-disc changer according to the present invention.

First, a plurality of optical discs are seated respectively in the slots of the multi-tray 10 of the multi-disc changer constructed as described previously with reference to Fig. 1 (S10). If a user requests playback of the optical disc in a specific slot, then the

VDP system 40 identifies a number of the specific slot and controls the servo system 20 to rotate the multi-tray for the optical disc to be located at a position readable by the optical pickup 30.

The VDP system 40 then performs a reproduction operation of processing an RF signal read by the optical pickup 30 and outputting the resulting signal to an external device, such as a television set or audio set (S11).

On the other hand, in the case where the user requests an 'all disc repeat play' operation' operation (S12), the VDP system 40 identifies the type of the optical disc seated in, for example, the first slot 101 of the multi-tray 10 (S13). If the identified type of the optical disc is a DVD series optical disc, for example, a DVD-ROM (S14), the DVD is identified through disc type information Disc-Type information recorded in a lead-in area LIA of the DVD-ROM. Thereafter, navigation information in the data area, for example, video management information VMGI is read and downloaded to the device (S15).

The VDP system 40 then retrieves and identifies a start address of each title Title_Start_Address included in the downloaded navigation information, so that it omits a typical initial operation of outputting and displaying a DVD title menu picture in a still mode as stated previously

with reference to Fig. 2 (S16).

As shown in Fig. 4, the VDP system 40 also selects any one title with the longest playback time from among a plurality of titles recorded in the data area as a main title with reference to the start address of each title in the navigation information, and reproduces only A/V data corresponding to the main title by force. If the reproduction of the main title is completed, then the VDP system 40 terminates the reproduction of the DVD by force so that the menu picture might not be displayed in the still mode (S17).

As an alternative, where content type information for each title Title_Content_Type is included in the navigation information, the VDP system 40 can select and reproduce only a title other than titles such as an advertisement, a production note, etc., for example, a title of A/V data corresponding to a movie or music.

On the other hand, where the identified optical disc type is not a DVD-series optical disc type, but, for example, a CD-series optical disc type, the VDP system 40 performs a typical play operation (S18).

Thereafter, upon receiving the user's request to stop the all disc repeat play operation (S19), the VDP system 40 identifies the current operation mode, that is, the type of the optical disc seated in the next slot, and stops the

series of the repeated reproduction operations of repeatedly performing the steps S14 to S18 according to the type of the optical disc (S20). On the other hand, the VDP system 40 controls the servo system 20 to successively and repeatedly perform the series of operations of identifying the type of the optical disc seated in the next slot if the user makes no request to stop the all disc repeat play operation (S21).

For reference, in the case of identifying the type of an optical disc corresponding to the DVD series under the condition that a user requests the 'all disc repeat play' operation, as stated above, the VDP system may perform a series of operations of identifying the type of an optical disc seated in the next slot, while omitting a reproduction operation for the DVD-series optical disc. In this case, there is a problem in that the VDP system cannot reproduce a title recorded on the DVD-series optical disc.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

[Effect of the Invention]

The method of repeatedly reproducing the whole discs

in the multi-disc changer according to the present invention, which is configured as described above may omit the still mode operation of displaying the DVD title menu picture in the case where the type of the optical disc to be currently reproduced is a DVD-series disc when the all disc repeat play is performed with respect to the plural optical discs seated in the multi-disc changer, select and reproduce any one of A/V data of the main title recorded in the DVD, and select and reproduce any one of A/V data of the title corresponding to a move or music to successively reproduce and output it, thus making it possible to effectively prevent the stoppage of the all disc repeat play operation requested by the user based on the navigation information of the DVD.

[CLAIMS]

[Claim 1]

A method of repeatedly reproducing all discs in a multi-disc changer comprising:

a first step of performing an all disc repeat play operation with plural optical discs seated in the multi-disc changer;

a second step of identifying the type of an optical disc to be currently reproduced while the all disc repeat play operation is performed;

a third step of omitting a still operation according to navigation information of the DVD in a case where the type of the identified optical disc is a DVD disc; and

a fourth step of reproducing A/V data corresponding to at least one or more titles recorded in the DVD after omitting the still operation.

[Claim 2]

The method according to claim 1, wherein

the third step includes omitting an initial user menu output operation according to the navigation information of the DVD.

[Claim 3]

The method according to claim 1, wherein

the fourth step includes selecting and reproducing only the A/V data of any one title with the longest data length among the titles recorded in the DVD.

[Claim 4]

The method according to claim 1, wherein

the fourth step includes selecting and reproducing only the titles of A/V data corresponding to a movie or music among the titles recorded in the DVD.

[Claim 5]

A method of repeatedly reproducing all discs in a multi-disc changer comprising:

a first step of performing an all disc repeat play operation with plural optical discs seated in the multi-disc changer;

a second step of identifying the type of an optical disc to be currently reproduced while the all disc repeat play operation is performed;

a third step of selecting A/V data of any one title with the longest data length among titles recorded in a DVD in a case where the type of the identified optical disc is the DVD disc; and

a fourth step of reproducing the A/V data of the selected title.

[Claim 6]

A method of repeatedly reproducing all discs in a multi-disc changer adapted to wait at a menu picture before or after DVD reproduction in a general play mode, comprising:

a first step of identifying the type of an optical disc to be reproduced when an all disc repeat play mode is set in the multi disc changer in which plural optical discs are seated;

a second step of forcibly reproducing a title recorded in a DVD according to navigation information of the DVD in a case where the type of the identified optical disc is the DVD; and

a third step of forcibly terminating the reproduction of the DVD upon termination of the reproduced title.

[Claim 7]

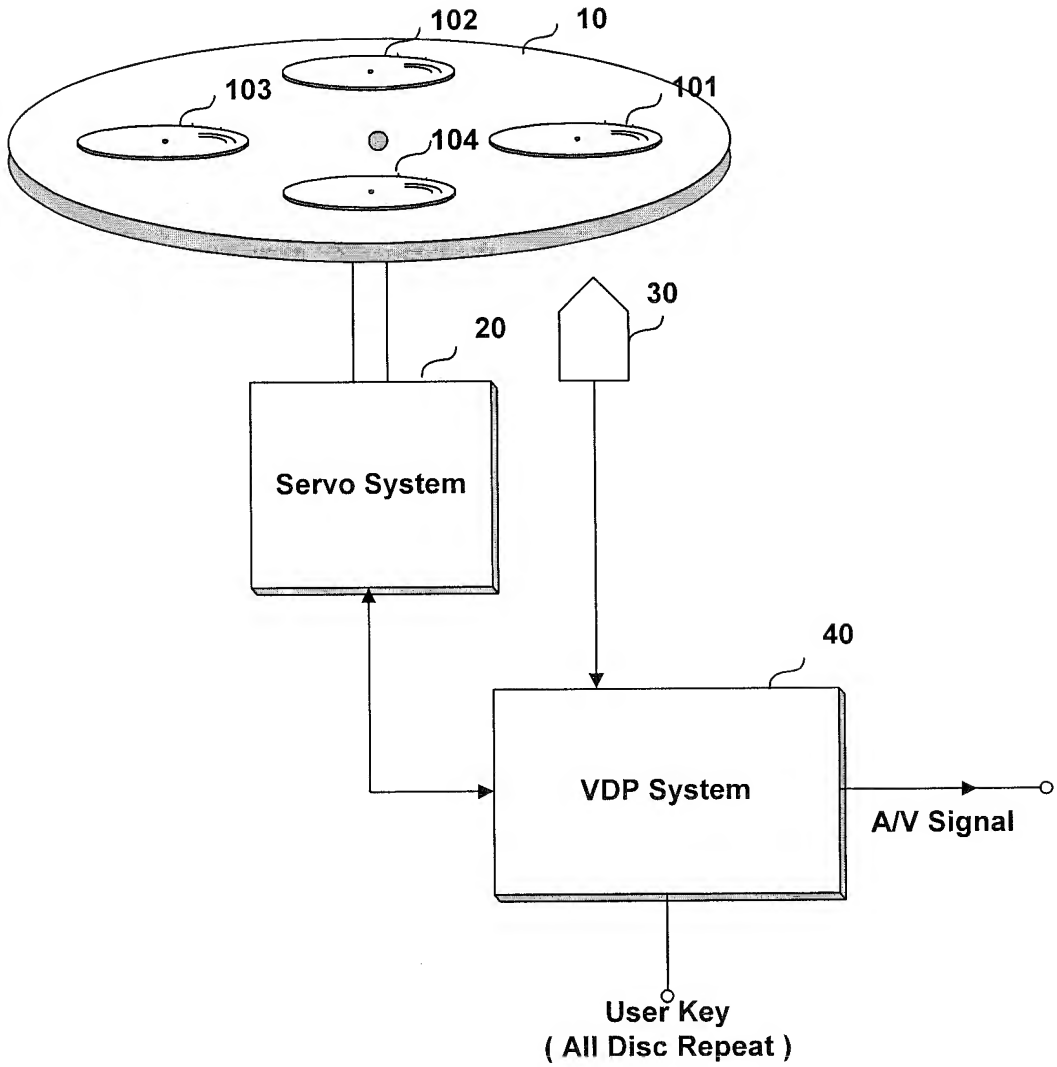
The method according to claim 6, wherein the forcible reproduction and termination are performed by omitting the operation of waiting at said menu picture before or after the DVD reproduction.

[Claim 8]

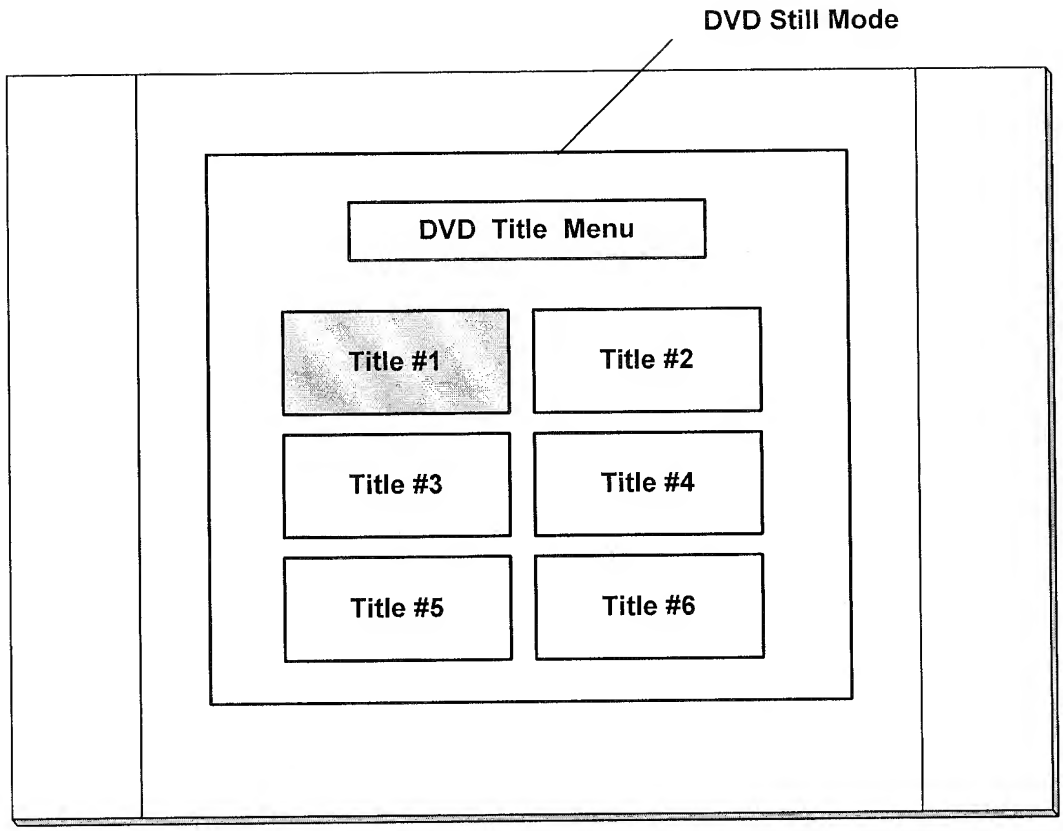
The method according to claim 6, wherein the first

step includes selecting and forcibly reproducing a title with the longest data length among the titles recorded in the DVD.

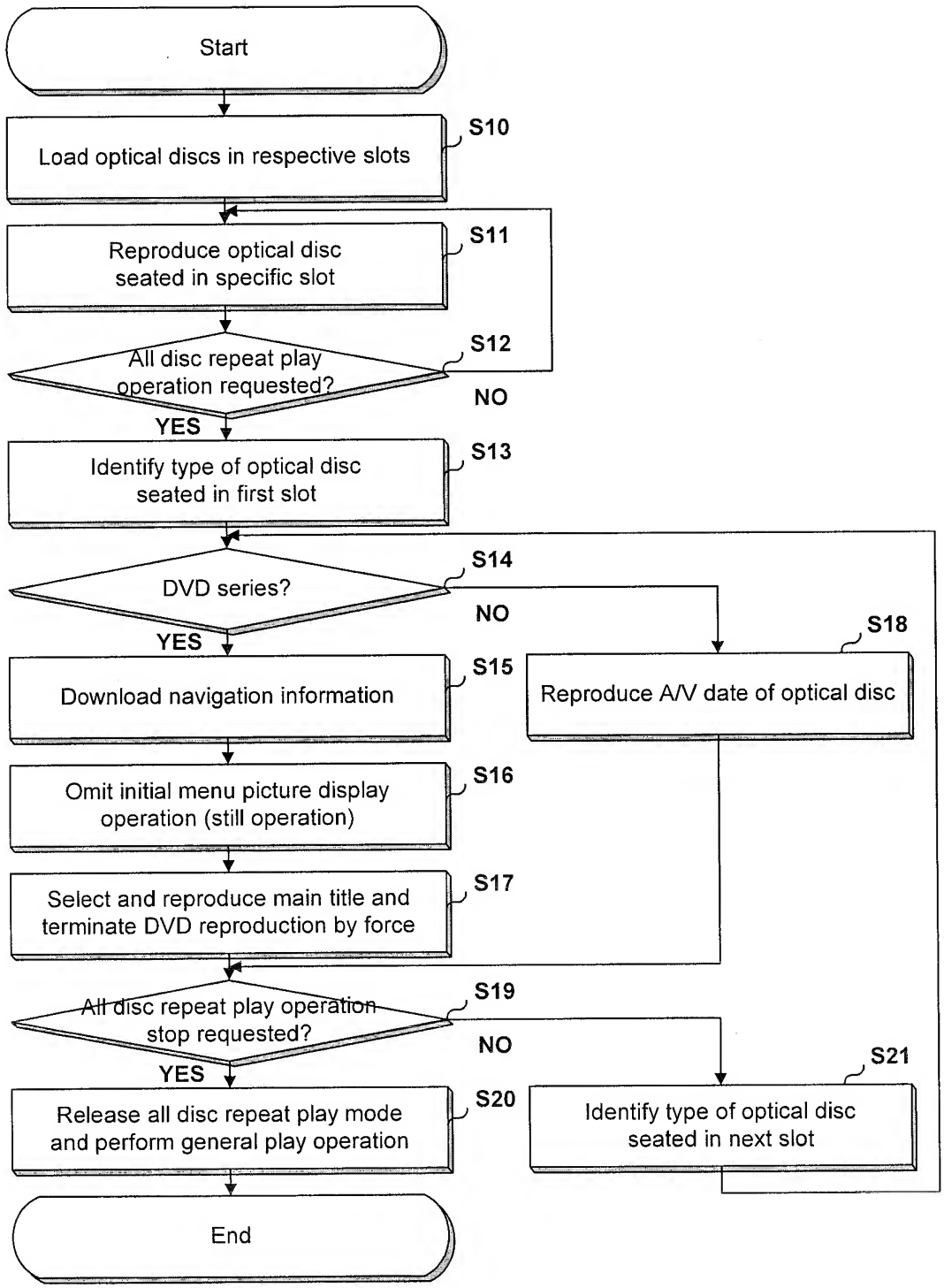
[Figure 1]


102
10
103
101
104
30
20
Servo System
40
VDP System
A/V Signal
User Key
(All Disc Repeat)

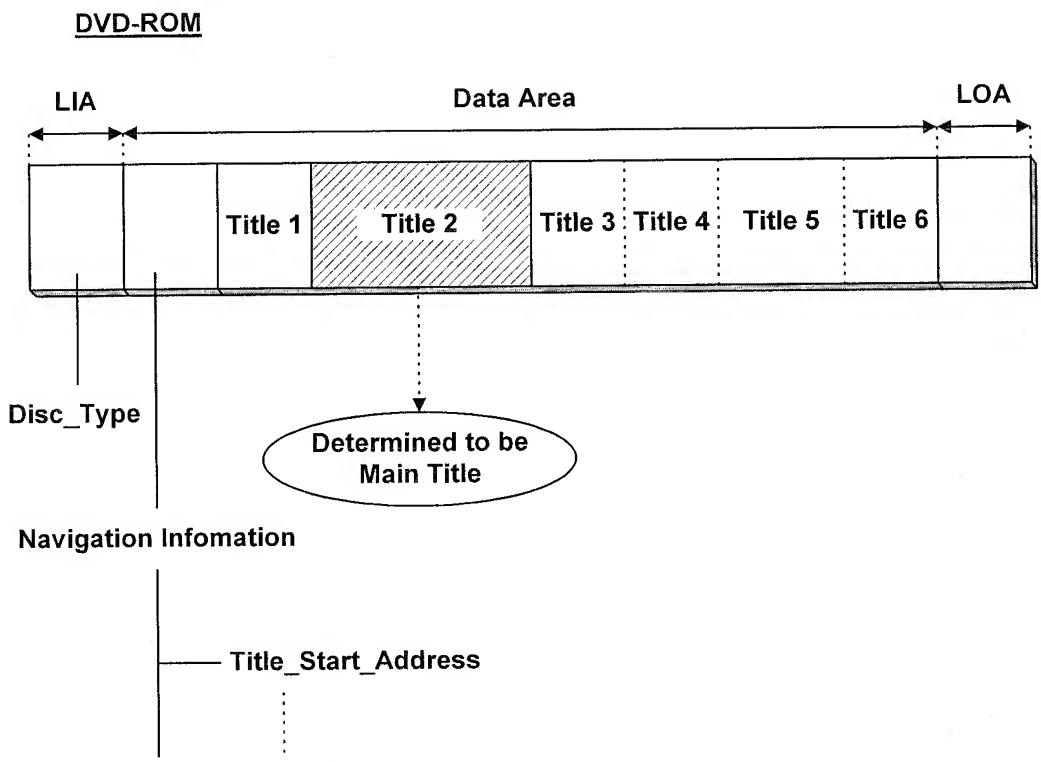
[Figure 2]


DVD Still Mode
DVD Title Menu
Title #1
Title #2
Title #3
Title #4
Title #5
Title #6

[Figure 3]


Start
Load optical discs in respective slots
S10
Reproduce optical disc seated in specific slot
S11
All disc repeat play operation requested?
S12
NO
YES
Identify type of optical disc seated in first slot
S13
DVD series?
S14
NO
YES
Download navigation information
S15
Reproduce A/V date of optical disc
S18
Omit initial menu picture display operation (still operation)
S16
Select and reproduce main title and terminate DVD reproduction by force
S17
All disc repeat play operation stop requested?
S19
NO
YES
Release all disc repeat play mode and perform general play operation
S20
Identify type of optical disc seated in next slot
S21
End

[Figure 4]


DVD-ROM
LIA
Data Area
LOA
Title 1
Title 2
Title 3
Title 4
Title 5
Title 6
Disc_Type
Determined to be Main Title
Navigation Infomation
Title_Start_Address